

TRANSPORTATION SECTOR: SAFER, CLEANER SCHOOL BUSES

◆ CALIFORNIA

Safe School Bus Clean Fuels Demonstration Project



In 1977 the federal government strengthened minimum safety standards for school buses. Unfortunately, many old buses remained in use, endangering school children and contributing to California's air pollution problems because of their age and low energy efficiency. The safe school bus clean fuel demonstration program is a four-phase project designed to demonstrate new clean fuel or high efficiency diesel fuel school buses that meet federal safety requirements.

At the time of the latest interim report (May 1999), phase three of the program was completed and phase four was beginning. The first three phases replaced old buses with advanced diesel, compressed natural gas, and methanol powered buses. These buses were placed at 124 Local Education Agencies across the state of California. The schools pledged to keep detailed records about their participation in the demonstration project—including miles traveled, fuel used, fuel costs, maintenance and repair costs, problems encountered, and a number of other variables. Phase four will place additional natural gas buses as these have been found to be the most reliable and cost-effective.

Results:

The safe school bus project has replaced 777 old diesel buses with 217 compressed natural gas buses, 150 methanol buses, and 410 advanced diesel buses. In addition to enhancing safety and reducing particulate, carbon monoxide, halocarbon, and nitrous oxide emissions up to 90%, the buses have significantly reduced emissions of carbon dioxide. Annual emission reductions from methanol buses amount to 574 metric tons of CO₂ (156 MTCE*). The savings from the natural gas buses are estimated at 2,085 metric tons CO₂ (569 MTCE*) each year, and the annual savings from improved fuel efficiency amount to 3,026 metric tons CO₂ (825 MTCE*). Together, the improved fleet of school buses saves 5,685 metric tons of CO₂ emissions (1,550 MTCE*) annually. In addition, the advanced diesel and phase three natural gas buses have lower per mile operating costs than the pre-1977 buses. Furthermore, since the program began in 1990, only one of the new school buses has been involved in an accident and no serious injuries were sustained in that accident.

Number of New Buses	Greenhouse Gas Reductions
777	1,550 MTCE*/yr

Principal Actors:

The Safe School Buses Clean Fuel Demonstration Project is a program of the California Energy Commission. Funding was obtained in part from the Petroleum Violation Escrow Account. One hundred and twenty four local education agencies and numerous organizations and corporations also worked to make the program a success.

Additional Information:

Al Deterville, Transportation Technologies and Fuels Office, California Energy Commission, 916-654-4685, <http://www.energy.ca.gov/afvs/schoolbus/index.html>.

This case study is based on information provided in the Safe School Bus Clean Fuels Demonstration Project Interim Report (May 1999).

*Original data have been converted from gallons of fuel used to Metric Tons of Carbon Equivalent (MTCE) (1 metric ton CO₂ is equivalent to 0.27 metric ton carbon equivalent).

The following emission factors were used to calculate CO₂ emissions:

Diesel Fuel: 23.83 lbs. CO₂/gallon

Methanol: 21.09 lbs. CO₂/gallon gasoline equivalent

Compressed Natural Gas: 17.78 lbs. CO₂/gallon gasoline equivalent

These emission factors were derived from fuel carbon contents and fuel energy contents from the U.S. Department of Energy—Energy Information Administration, the California Energy Commission, and the Nebraska Geographic Alliance.